

Advanced Modeling of Fluid-Structure Interaction for Softgoods in Supersonic Flow

Completed Technology Project (2016 - 2019)



Project Introduction

Developing, verifying and validating a new simulation tool for modeling parachute inflation in supersonic flow.

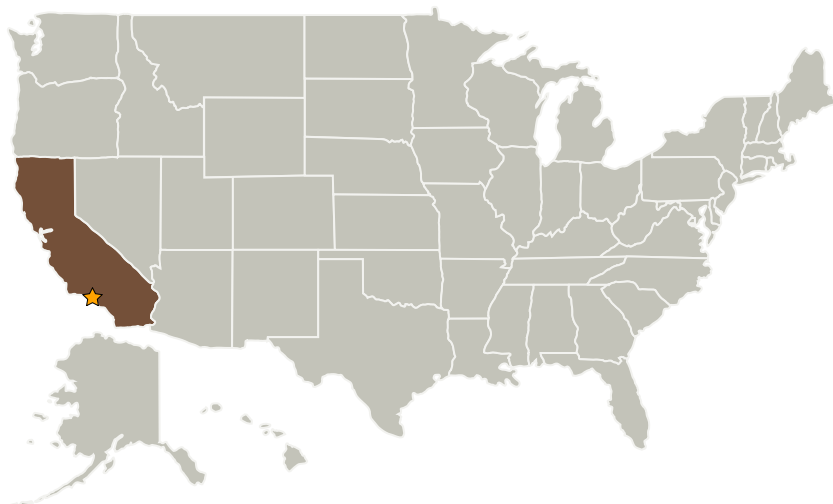
Research will investigate and bring to application maturity a new simulation approach for modeling fluid-structure interaction in supersonic flows. The particular application of interest is the highly dynamic parachute inflation phase in supersonic flow. The new approach uses a lagrangian structural mesh embedded within an eulerian flow. This will lead to a breakthrough capability not currently possible with existing tools.

Anticipated Benefits

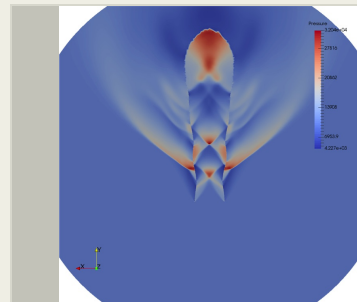
This will enable the development of simulations of parachute inflation for design and verification of planetary atmospheric entry systems.

Ensure reliable parachute deployment for Mars spacecraft during atmospheric entry.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California



2D Simulation of an unfolding fabric in supersonic flow.

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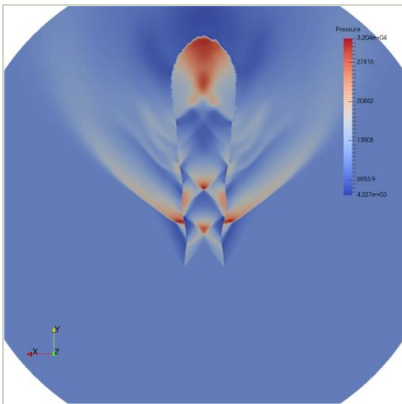
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Primary U.S. Work Locations

California

Images



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2D Simulation of an unfolding fabric in supersonic flow.

(<https://techport.nasa.gov/image/24454>)

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Independent Research & Development: JPL IRAD

Project Management

Program Manager:

Fred Y Hadaegh

Project Manager:

Fred Y Hadaegh

Principal Investigator:

Lee D Peterson

Co-Investigators:

Armen Derkevorkian
Charbel Farhat
Jason Rabinovitch
Christopher L Tanner

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Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.5 Revolutionary Communications Technologies
 - └ TX05.5.3 Hybrid Radio and Optical Technologies

Target Destinations

Mars, Foundational Knowledge

Supported Mission Type

Push